

## INSIDE

2

From Scott's desk

3

From Jeanette's desk:  
A bittersweet farewell

Terry Taddeucci retires

5

Boshier, Espy named  
2014 APS Fellows

Tainter garners best  
poster award

Celebrating service

6

Mosby receives LDRD  
Early Career Research  
grant to study nuclear  
reactions with rare  
isotope beams

7

Los Alamos prototype  
gamma-ray imaging  
microscope debuts at  
HIGS facility

8

Heads UP!  
ADEPS Environmental  
Action Plan for FY15



Photo by Sandra Valdez, NIE-CS

## P-27's Group Office and User Office Administrative Team

*Contributing to excellence in safety, security, and conduct of operations*

*By Diana Del Mauro, ADEPS Communications*

On the Los Alamos Neutron Science Center (LANSCE) mesa, there's a spirit of camaraderie among support staff who joined forces when LANSCE Weapons Physics (P-27) was created late last year. Four administrators serve P-27's researchers, as well as hundreds of visiting scientists who run experiments at the national user facility.

Operating "like four peas in a pod," as Julie Quintana-Valdez phrased it, the team model includes defined roles and responsibilities, yet emphasizes cross training and cooperation. "We can joke and be serious with each other. And we rely on each other a lot," Quintana-Valdez said.

Anna Llobet, P-27's acting deputy group leader for science, said the goal is an integrated team responsive "to the changing demands without compromising compliance with conduct of operations and service delivered to users and staff."

Read on to discover how each member upholds the team's mission.

*continued on page 4*



“

*We will have to wait and see how much of our proposed budget scenario they can afford in the coming years. I am confident, however, that DOE-NP understands the importance of the science we are pursuing thanks to the hard work of everyone involved in the program.*

”

## From Scott's desk ...

In addition to serving as deputy division leader for Physics, I am also LANL's program manager for our Office of Science-funded Nuclear Physics program. This \$25M per year program includes basic research topics such as determining whether the neutrino is its own anti-particle, studying a unique state of matter called a quark-gluon plasma, and searching for new physics beyond the current Standard Model through precision studies of neutron properties. It also includes a major effort to produce radioactive isotopes for medical procedures and research and important contributions to nuclear data. The work is conducted as a collaboration between experimentalists and theorists, and across multiple organizations at LANL.

The annual budget review for our Nuclear Physics (NP) program was held last week by the Office of Nuclear Physics (DOE-NP), a part of the DOE Office of Science. This exercise is the main venue for discussing our plans for LANL's \$25M NP program with our sponsors. These reviews are also the mechanism for DOE-NP to collect input from the national laboratories to help them prepare for the next President's Budget Request (PBR).

Like other parts of the federal government, DOE-NP prepares its input to the PBR two years in advance. Information we presented last week will be used for the FY17 PBR. We were directed to address three five-year budget scenarios that begin in FY17: funding at the level of FY16 PBR for the entire period, funding beginning at FY16 PBR in FY17 and increasing by 3% each year thereafter, and a funding scenario that we define. In the last scenario, we requested targeted increases in funding to address our highest priorities for new or increased areas of R&D.

The review lasted three hours. I presented an overview of our current program and our analysis of the three budget scenarios. I tried to clearly delineate what science could be performed in each scenario and the long-term consequences to our nuclear physics capabilities. I concluded with a few experimental highlights. The substance of my talk came from extensive input from the Nuclear Physics PIs and discussions with LANL management. Eva Birnbaum, program manager for Isotope Production and Applications, presented more detail on this component of the program. Joe Carlson, T-2 group leader, did the same for the theory component. Finally Ming Liu, PHENIX team leader in P-25, gave a technical highlight presentation focused on the E906 experiment at Fermilab to measure quark and gluon energy loss in nuclear matter. He ended with a brief description of our (LDRD-funded) effort to develop a new Fermilab experiment that will help to understand the origin of the proton's spin.

Federal budgets remain constrained and DOE-NP is building a new accelerator, the Facility for Radioactive Ion Beams at Michigan State University, while operating two existing accelerators (CEBAF at Jefferson Lab and RHIC at Brookhaven). This puts a strain on R&D budgets and limits both ongoing efforts and potential new starts. We will have to wait and see how much of our proposed budget scenario they can afford in the coming years. I am confident, however, that DOE-NP understands the importance of the science we are pursuing thanks to the hard work of everyone involved in the program.

*Physics Deputy Division Leader Scott Wilburn*

## From Jeanette's desk ...



### A bittersweet farewell

I've worked with so many wonderful people in Physics Division over the past 20+ years—in P groups and with managers such as John Moses (P-3), John Moses and Tom Bowles (P-23), Chris Wood, Bob Scarlett, and Joysree Aubrey (P-21), and lastly Doug Fulton and Scott Wilburn (P-DO).

Before joining the Division Office in 2007, I occasionally had supported the past five Physics division leaders—Damon Giovanielli, Peter Barnes, Susan Seestrom, Jack Shlachter, and Doug Fulton.

My time with P Div has been a wonderful journey. I've always referred to working in Physics as "GOLD"—meaning, like in the Olympics, it's the best place you can be.

Over the years I've received several awards, but the biggest reward to me are all the friends I have made over the years.

*Jeanette Gray*

## Terry Taddeucci retires

Terry Taddeucci joined Los Alamos in 1986 as a member of P-2, the Nuclear and Particle Physics Research group. Prior to coming to P-2, he studied nuclear reactions, in particular the relationship of beta-decay strength functions to (p,n) reaction cross sections at intermediate energies. His results are still the standard today. In P-2, he also helped develop the neutron time-of-flight facility (NTOF) at the Los Alamos Meson Physics Facility (LAMPF).

Taddeucci then moved to MP Division for additional intermediate energy experiments and to mentor many graduate students and postdoctoral researchers.

After the closure of LAMPF, he returned to Physics Division and worked on nuclear physics experiments at the WNR unmoderated neutron spallation source, developing a dedicated source for neutron radiography and applying it to important weapons problems. He also rotated through the position of group safety officer. His group ultimately became part of LANSCE Division.

More recently Taddeucci worked on the Chi-Nu experiment that will provide more accurate data on prompt fission neutron spectra. His Monte Carlo neutronics modeling uncovered important neutron-scattering aspects of previous experiments that had been the cause of discrepant data in the literature. For this work and for studying these effects to design the present experiment, he was awarded an NNSA Defense Programs Award of Excellence in 2014.

Taddeucci's work has always been careful, precise, insightful, and presented with clarity, thorough understanding, great credibility and often, to make a point, disarming humor. After retiring, he said he expects to continue making research contributions, but is looking forward to spending more time on his other interests—fly fishing, free-heel skiing, and photography. This is summed up by the picture he left on his office door, simply captioned "gone fishing."

Team cont.

P-27 Group Office Administrator **Julie Quintana-Valdez** handles the majority of the group's purchasing, processes visitor agreements and registrations, draws up contracts with external scientific collaborators, prepares hiring and departing packages for students, and manages routine personnel actions such as time and effort approval and badge and dosimetry requests. She assists the Accelerator Operations and Technology Division with its purchasing and the Experimental Physical Sciences Directorate (ADEPS) office with contracts and purchasing.



"Everything changes so much every day that we have to roll and adapt," said Quintana-Valdez, adding her goal is to "do everything the best I can, right away."

Previously, Quintana-Valdez was office administrator for the LANSCE Nuclear Science group. "I've been on the LANSCE mesa for a little more than 16 years," she said. Her alternate is Rose Romero.

**Rose Romero** is User Program Office Administrator for the LANSCE national user facility. She also organizes the two-week LANSCE School on Neutron Scattering, which draws international visitors to the facility interested in learning about neutron scattering techniques. Romero oversees logistics for the event, arranging hotels and transportation and planning dinners—within budget and according to Laboratory policy. Meeting planning has been her specialty since joining the Laboratory 19 years ago; previously, she was the ADEPS conference coordinator. "I really enjoy working for P-27," Romero said. "It has been a great challenge and opportunity for me."



Romero is responsible for ensuring hundreds of annual users have their paperwork, badges, and authorizations before they arrive. "I never realized what all it entailed," she said. "It's challenging, but it's interesting."

Users from academia, industry, and research facilities around the world compete for use of the neutron beam, which enables a wide variety of scientific research. For the Lujan Center's and Weapons Neutron Research (WNR) flight paths, Romero confirms beam time allocations and schedules and ensures users have the required safety training. Her alternate is Tanya Herrera.

Whatever it takes—working odd hours or driving a forklift to move boxes containing valuable experimental equipment—Industry Contracts and Shipping Administrator **Tanya Herrera** serves members of industry who come to test their

semiconductor chips at Icehouse I and II experimental areas. She prepares for their arrival, helps during their stay, and arranges their departure. Herrera must ensure the details of their work and their samples are kept proprietary.



"This is where (scientists from around the world) do experiments so that cars or computers or airplanes or pacemakers aren't going to fail," Herrera said. "To me, it's a good feeling to know I helped someone, and they thank me all the time." As a newly appointed instrument assistant, Herrera knows how to adjust the beam spot for each experiment, fishing from the beam line a steel cylinder and inserting another with the desired aperture.

Since 1998 she has held various administrative positions at the Lab; for the past five years she served as user program office administrator for the LANSCE nuclear science research program and prior to that was the Lujan Center group office administrator. Her alternate is Gerri Barela.

**Gerri Barela** is Experiment Coordinator and Integrated Work Document Coordinator. She aids the success of Lujan Center and WNR experiments by confirming that they comply with LANSCE procedures and are authorized to begin, and by helping to solve challenges encountered by users during their experiments.



Barela conducts tours and safety orientations for new users and verifies their access and credentials. For non-industry-affiliated scientists, she manages experimental samples that come in and out of WNR and Lujan Center facilities, ensuring compliance with the 70-page *LANSCE Experimental Areas Operations Plan: Lujan Center and WNR*. She coordinates sample shipments with users, and labels, stores, and tracks samples through a database and monthly audits. She is responsible for integrated work documents, which outline the process for performing technical or scientific work at the Laboratory. She also provides administrative support for scientists working in the Lujan Center, including those in the Materials Science and Technology and Materials Physics and Applications divisions. "My goal is to become an asset to P-27," said Barela, who has more than 10 years of experience as a LANL administrative assistant. For the past year, she was a professional staff assistant for the Lujan Center. Her alternate is Julie Quintana-Valdez.

Beginning in March Barela will be assisting the Physics Division Office as a replacement is sought for Jeanette Gray, who is joining ADX to support Bob Webster and Michael Bernardin.

## Boshier, Espy named 2014 APS Fellows

The American Physical Society recently elected Malcolm Boshier and Michelle Espy (both Applied Modern Physics, P-21) as 2014 Fellows.

Boshier was cited for “high precision laser spectroscopy of hydrogen and muonium, and for advancing the state of the art in cold atom manipulation.” The APS Division of Atomic, Molecular & Optical Physics nominated him. He received a D.Phil. in atomic physics from the University of Oxford and joined the Laboratory in 2002. His atomic and optical physics research uses atoms to make better sensors to measure rotations, gravity, and magnetic fields. For many of these applications, it is best to use atoms that have been cooled extremely close to absolute zero temperature, where the atoms form a kind of giant matter wave called a Bose-Einstein condensate (BEC). In many ways a BEC is an atomic analog of the laser. Boshier and collaborators have developed some unique techniques for creating and manipulating BECs. He has received a Laboratory Small Team Distinguished Performance Award.

Espy was cited for “the application of nuclear physics techniques to biomedical research and national security challenges. Including pioneering work in the application of ultra-low field nuclear magnetic resonance to functional brain imaging and non-invasive identification of materials for national security.” The APS Division of Nuclear Physics nominated her. Espy earned a PhD in physics from the University of Minnesota and joined the Laboratory in 1996. She investigates applications of nuclear physics to brain imaging and national security. Espy has won a R&D 100 Award and Laboratory Distinguished Performance Awards.

## Celebrating service

Congratulations to the following Physics Division employees celebrating service anniversaries recently:

Gregg Chaparro, P-27 .....	35 years
Juan Fernandez, P-24 .....	35 years
John George, P-21 .....	30 years
Peter Pazuchanics, P-23 .....	30 years
Valorie Allison, P-21 .....	10 years
Robert Bolger, P-21 .....	10 years
Mikkel Johnson, P-25 .....	10 years
Sha-Marie Reid, P-24 .....	10 years



## Tainter garners best poster award

Amy Tainter, an undergraduate student in Subatomic Physics (P-25), won a Best Poster award at the Undergraduate Conference of Women in Physical Sciences, held at the University of Nebraska-Lincoln.

The poster, “An Optical Diagnostic for Surface Velocity Measurements at the Los Alamos Proton Radiography Facility,” featured her work building and testing a photon Doppler velocimetry unit at a fraction of the cost of a purchased one. The inexpensive units will allow the Lab’s Proton Radiography Facility (pRad) to expand its surface diagnostics capabilities for the demands of modern dynamic experiments.

Tainter, who will receive her bachelor’s degree in engineering from Northern New Mexico College this spring, has been a member of the Laboratory’s pRad team since 2008. Dale Tupa (P-25) mentors her.

Invented at Los Alamos National Laboratory, proton radiography uses a high-energy proton beam at the Los Alamos Neutron Science Center to image the properties and behavior of materials under a variety of conditions. The penetrating power of high-energy protons, like that of x-rays, makes them an excellent probe of a wide range of materials under extreme pressures, strains, and strain rates. The NNSA Science Campaigns primarily fund the pRad capability.

The pRad Facility, a national user facility, supports the Laboratory’s Nuclear Deterrence mission area and enables fundamental science discoveries as part of the Science of Signatures and Materials for the Future science pillars.

*Technical contact: Amy Tainter*



**Tainter with the photon Doppler velocimetry unit.**

## Mosby receives LDRD Early Career Research grant to study nuclear reactions with rare isotope beams

Nuclear reactions have been studied for decades due to the important ramifications in basic and applied fields such as astrophysics, nuclear energy, and defense.

The Los Alamos Neutron Science Center (LANSCe) provides a unique capability for these types of studies, with high intensity neutron beams and world-class nuclear science instruments. Many reactions, however, particularly those relevant to weapons physics, occur on short-lived isotopes, which makes them difficult to measure using conventional techniques.

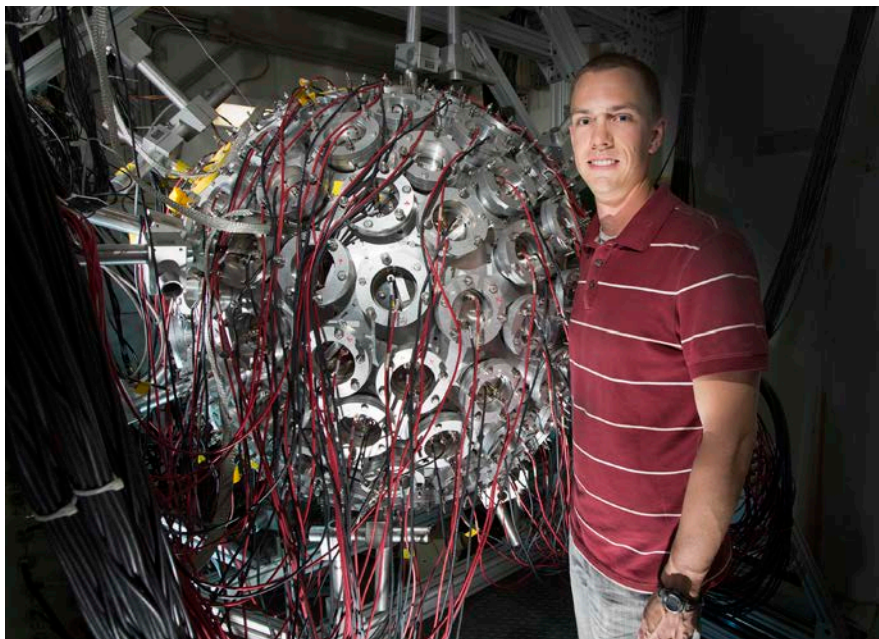
Shea Mosby (LANSCe Weapons Physics, P-27) has proposed applying recent developments in the study of gamma emission following reactions on unstable isotopes to nuclear reaction studies important for defense programs. This would allow measurements of the underlying nuclear physics needed to predict reaction cross sections in explosive environments.

His research, which supports the Laboratory's National Security Science mission and Nuclear and Particle Futures science pillar, is funded by an Early Career Research grant from the Laboratory Directed Research and Development program.

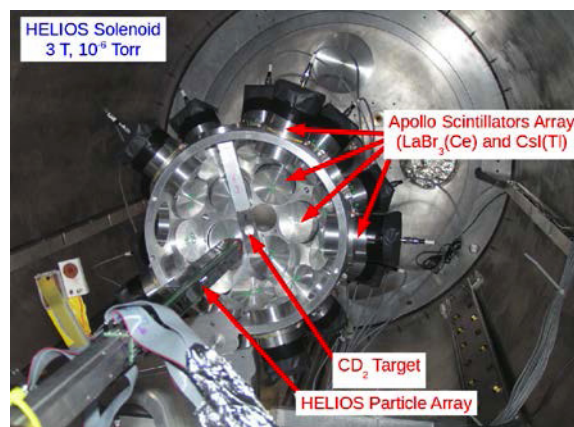
The proposal, "A step toward nuclear reaction studies for applications at FRIB," focuses on the study of neutron capture reactions, and makes use of the Detector for Advanced Neutron Capture Experiments (DANCE) and the Apollo instrument, both which were developed by scientists now in P-27. DANCE is the premier instrument in the world for measuring neutron-capture cross sections on stable or long-lived nuclei, and has successfully measured neutron capture reactions for astrophysics, nuclear energy, and defense.

The Apollo instrument was specifically developed for rare-isotope ion beam experiments as part of a recent Laboratory Directed Research and Development-Directed Research LDRD-DR project on nuclear astrophysics, and has the potential to greatly improve knowledge of neutron capture cross sections on short-lived nuclei through a combination of experiments and nuclear reaction theory.

The proposal seeks to probe this experimental method by measuring the same nucleus using both DANCE and Apollo. Once validated, the method can be used at the existing CARIBU (for Californium Rare Isotope Breeder Upgrade) facility at Argonne National Laboratory and ultimately at the



**Mosby with the Detector for Advanced Neutron Capture Experiments (DANCE), which is designed to study capture reactions on small quantities of radioactive isotopes (down to 1 mg or up to 1 Ci), which are of interest to studies in nuclear astrophysics and stockpile stewardship science.**

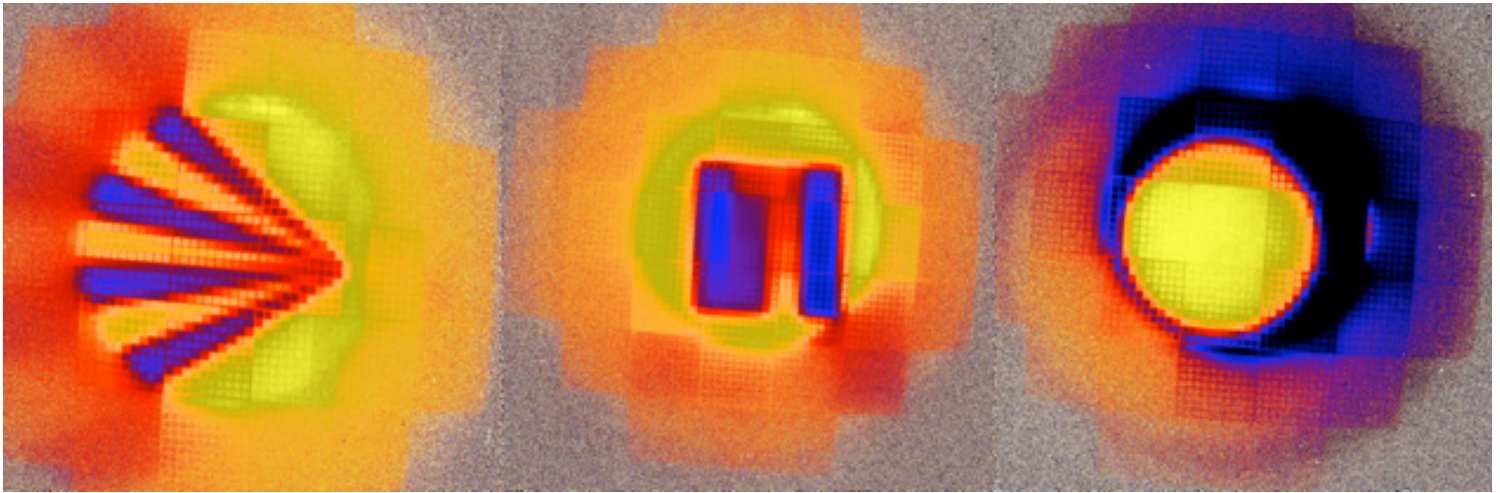


**Los Alamos scientists developed the Apollo instrument, which is shown installed in the helical orbit spectrometer (HELIOS) at Argonne National Laboratory.**

Facility for Rare Isotope Beams (FRIB) at Michigan State University when that facility is completed in 2022.

Mosby received his PhD in physics from Michigan State University in 2011 before joining the LANSCe Neutron & Nuclear Science group in 2012 as a postdoctoral researcher to work on low energy nuclear reaction studies. He became a LANL staff member in 2014.

*Technical contact: Shea Mosby*



## Los Alamos prototype gamma-ray imaging microscope debuts at HIGS facility

The paucity of diagnostic information about the compressed target near stagnation is a significant challenge for understanding the performance of implosions of deuterium and tritium filled capsules on the National Ignition Facility (NIF). Ignition performance is directly tied to the areal density of the fuel payload. Scattered neutron images and down scattered neutron ratios are often inconsistent with each other, as well as simulated performance, leading to uncertainty about the exact state of the fuel payload.

To resolve these inconsistencies, and to provide prospects for time-resolved imaging of the fuel assembly, Los Alamos scientists, in collaboration with the Center for Gamma Ray Imaging (CGRI) at the University of Arizona, Tucson, have been developing a prototype gamma-ray imaging microscope (GRI $\mu$ ) to image MeV-scale gamma rays that are emitted during the implosions of NIF capsules. Images of 4.4 MeV gamma rays show the location of carbon ablator material, relative to the deuterium/tritium (DT) fuel, and provide a critical constraint on the volume and shape of the compressed assembly.

Recently, Daniel Lemieux (Plasma Physics, P-24, and CGRI), who designed and built the prototype microscope, performed characterization tests using the High Intensity Gamma-Ray Source (HIGS) at Duke University. Lemieux teamed with his dissertation advisers, Gary Grim (formerly LANL, now Lawrence Livermore National Laboratory) and Brad Barber (University of Arizona), on the project. The HIGS run was successful with three full days of taking beam and several hundred images collected.

Previously, the prototype collected time-integrated radiographs of plastic shells as they were imploded by the Omega laser at the University of Rochester. The radiographs were created by bremsstrahlung radiation from hot electrons generated at the critical surface of the laser illuminated plastic shell. Since this radiation is relatively soft ( $\sim 100$  keV compared to the 4.4 MeV energy the system is

Image data collected at HIGS using the Los Alamos GRI $\mu$  camera. Left: a simple high contrast phantom target of tungsten wedges. Center: a slit object formed with tungsten blocks. This slit image, along with a tungsten edge image, will be analyzed to assess the camera system resolution. Right: a simulated penumbral image of a plastic shell in a National Ignition Facility (NIF) implosion. This image will undergo reconstruction, similar to what is done for the NIF neutron imaging system, and compared to the data used to create the test object that generated the image.



**Daniel Lemieux with the prototype GRI $\mu$  system being prepared for calibration and characterization tests at the High Intensity Gamma-Ray Source (HIGS), operated by Triangle Universities Nuclear Laboratory at Duke University.**

designed for), the GRI $\mu$  team took the prototype to HIGS to perform system characterization and calibration at the desired energy.

The Inertial Confinement Fusion and High Yield Campaign (Program Manager Steve Batha) funded the work, which supports the Lab's national security missions, including Stockpile Stewardship, and the High Energy Density Plasmas and Fluids science pillar.

*Technical contact: Daniel Lemieux*

# HeadsUP!

## ADEPS Environmental Action Plan for FY15

Environmental management will always be an ongoing effort. Our 2015 Environmental Action Plan addresses our impact on the environment and outlines steps we can take to reduce our impact and decrease the potential for, and severity of, any environmental damage.

We again focus upon three objectives: Clean the Past; Control the Present; and Create a Sustainable Future. These objectives parallel the LANL institutional objectives, with the targets fine-tuned to fit our Directorate's needs.

**Clean the Past: Reduce Environmental Risks from Historical Operations, Legacy and Excess Materials, and Other Conditions Associated with Activities No Longer a Part of Current Operations.**

Target 1: Ensure testing is continuing on our peroxide-forming chemicals; update the current inventory of all peroxide-formers.

Target 2: Reduce ADEPS surplus equipment, salvaging or recycling wherever appropriate; inventory and work to minimize use of transportainer storage units; reduce total volume of chemical containers; properly disposition unwanted/unneeded office and lab items; properly disposition legacy records and documents.

Action 1: Reduce, Salvage and Recycle

Action 2: Transportainer Inventory, Clean-out, and Removal

Action 3: Combined Effort: MPA/MST Clean Up of Rad-Contaminated Vacuum Pumps and other Legacy Items from 03-34. (Contingent on available funding)

Action 4: Transfer hazardous chemicals from LANSCE to ORNL-SNS

Action 5: Establish a common staging area for MST/MPA for salvaging/recycling.

**Control the Present: Control and Reduce Environmental Risks from Current, Ongoing Operations, Missions, and Work Scope.**

Target 1: Managers will conduct at least one environmentally-focused MOV in each quarter.

Target 2: Perform annual chemical inventories (90% of ChemLog entries inventoried).

Target 3: Communicate environmental objectives to the Directorate

**Note:** all three targets are assessed on an annual basis.

**Create a Sustainable Future: Reduce or Eliminate the Use of SF6 Green House Gas (GHG) by Recycle/Reuse or Replacement Activities.**

Target 1: Support institutional efforts towards SF6 reduction, elimination, and/or reclamation of this egregious GHG (greenhouse gas).



Creating a **Sustainable** future for generations to come

Target 2: If funded, advance the design and prep phases of the SF6 P2 project in the P23 Turbulence Lab.

Additionally: We need you to turn off lights in offices, conference rooms, hallways, and labs when not in use. Get that leaking faucet/toilet/urinal fixed (contact your facilities coordinator). Turn off computer peripherals when not in use. Alter your purchasing habits – Purchase GREEN. Use the blue and green recycling bins. Share chemicals, minimize chemical inventories, purchase safer alternatives, recycle and dispose properly. Salvage all unnecessary or unused (and not needed) equipment. Nominate a deserving colleague for a P2 Award!!

**Document, Record & Report** all significant environmental actions that you take that positively affect the environment. Remember, if it's not recorded, it didn't happen. Please send your environmental action updates to your Division's EAP contact (MPA: Susie Duran at [susiew@lanl.gov](mailto:susiew@lanl.gov); MST: Dan Thoma at [thoma@lanl.gov](mailto:thoma@lanl.gov); P: Steve Glick at [sglick@lanl.gov](mailto:sglick@lanl.gov)). This will ensure that our Directorate continues to get the recognition it deserves for our environmental efforts.

The plan in greater detail can be found at the LANL EMS web page at [int.lanl.gov/environment/ems/index.shtml](http://int.lanl.gov/environment/ems/index.shtml); then click on Tools - "EMS Action Plans."



Published by the Experimental Physical Sciences Directorate

To submit news items or for more information, contact Karen Kippen, ADEPS Communications, at 505-606-1822, or [kkippen@lanl.gov](mailto:kkippen@lanl.gov).

For past issues, see [www.lanl.gov/orgs/p/flash\\_files/flash.shtml](http://www.lanl.gov/orgs/p/flash_files/flash.shtml)



Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by Los Alamos National Security, LLC, for the National Nuclear Security Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. By acceptance of this article, the publisher recognizes that the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.



## LA-UR-15-21384

Approved for public release; distribution is unlimited.

Title: Physics Flash February 2015

Author(s): Kippen, Karen Elizabeth

Intended for: Newsletter  
Web

Issued: 2015-02-24

---

**Disclaimer:**

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the Los Alamos National Security, LLC for the National Nuclear Security Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.